

# 产品规格书

批准	审核	校核	编制
纪春华	朴致均	赵宇辉	郑羿
2019.08.05	2019.08.05	2019.08.05	2019.08.05

规格书更改履历:

序号	更改内容	履历号	更改时间	责任人
1	新规制定	000	2019.08.05	郑羿

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## SWITCHING REGULATOR APPLICATIONS

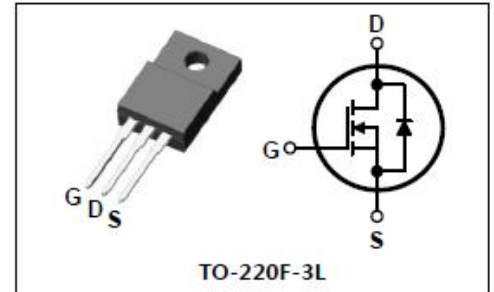
## PIN Connection

**Features**

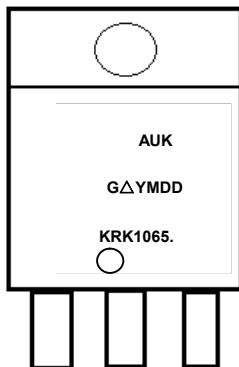
- High Voltage :  $BV_{DSS}=650V(\text{Min.})$
- Low  $C_{rss}$  :  $C_{rss}=13pF(\text{Typ.})$
- Low gate charge :  $Q_g=33nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=0.99\Omega(\text{Max.})$

**Ordering Information**

Type NO.	Marking	Package Code
KRK1065F KRK1065FA	KRK1065•	TO-220F-3L



. Dalian

**Marking Diagram**


Column 1 : Manufacturer

Column 2 : Production Information

e.g.) GYMDD

-. G : Factory management code

-.Δ: Machine code

-. YMDD : Date Code (year, month, date)

Column 3 : Device Code . Dalian

**Absolute maximum ratings ( $T_c=25^\circ\text{C}$  unless otherwise noted)**

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	$V_{DSS}$	650	V	
Gate-source voltage	$V_{GSS}$	$\pm 30$	V	
Drain current (DC) *	$I_D$	$T_c=25^\circ\text{C}$	10	A
		$T_c=100^\circ\text{C}$	5.7	A
Drain current (Pulsed)*	$I_{DM}$	36	A	
Power dissipation	$P_D$	32	W	
Avalanche current (Single) ②	$I_{AS}$	10	A	
Single pulsed avalanche energy ②	$E_{AS}$	877	mJ	
Avalanche current (Repetitive) ①	$I_{AR}$	10	A	
Repetitive avalanche energy ①	$E_{AR}$	3.2	mJ	
Junction temperature	$T_J$	150	°C	
Storage temperature range	$T_{stg}$	-55~150		

\* Limited by maximum junction temperature

# KRK1065F/FA

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	3.9	$^{\circ}C/W$
	Junction-ambient	$R_{th(J-A)}$	-	62.5	$^{\circ}C/W$

## Electrical Characteristics (T<sub>C</sub>=25 $^{\circ}C$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	2.0	-	5.0	V
Drain-source cut-off current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	1	$\mu A$
Gate leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	$\pm 100$	nA
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.5A$	-	0.72	0.99	$\Omega$
Forward transfer conductance ④	$g_{fs}$	$V_{DS}=10V, I_D=4.5A$	-	11.0	-	S
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=25V$ $f=1\text{ MHz}$	-	2150	-	pF
Output capacitance	$C_{oss}$		-	145	-	
Reverse transfer capacitance	$C_{rss}$		-	13	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=325V, I_D=10A$ $R_G=25\Omega$	-	134	-	ns
Rise time	$t_r$		-	105	-	
Turn-off delay time	$t_{d(off)}$		-	267	-	
Fall time	$t_f$		-	63	-	
Total gate charge	$Q_g$	$V_{DS}=520V, V_{GS}=10V$ $I_D=10A$	-	33	40	nC
Gate-source charge	$Q_{gs}$		-	12.5	-	
Gate-drain charge	$Q_{gd}$		-	8	-	

## Source-Drain Diode Ratings and Characteristics (T<sub>C</sub>=25 $^{\circ}C$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	$I_S$	Integral reverse diode in the MOSFET	-	-	10	A
Source current (Pulsed) ①	$I_{SM}$		-	-	36	
Forward voltage ④	$V_{SD}$	$V_{GS}=0V, I_S=10A$	-	-	1.4	V
Reverse recovery time	$t_{rr}$	$I_S=10A, V_{GS}=0V$ $dI_F/dt=100A/\mu s$	-	468	-	ns
Reverse recovery charge	$Q_{rr}$		-	3.3	-	$\mu C$

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② L=20mH,  $I_{AS}=10A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- ③ Pulse Test : Pulse width $\leq 300\mu s$ , Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

## Electrical Characteristic Curves

Fig. 1 Typical Output Characteristics

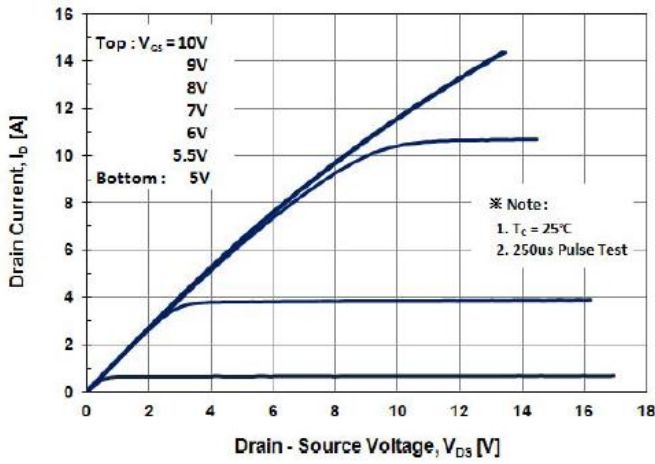


Fig. 2 Typical Transfer Characteristics

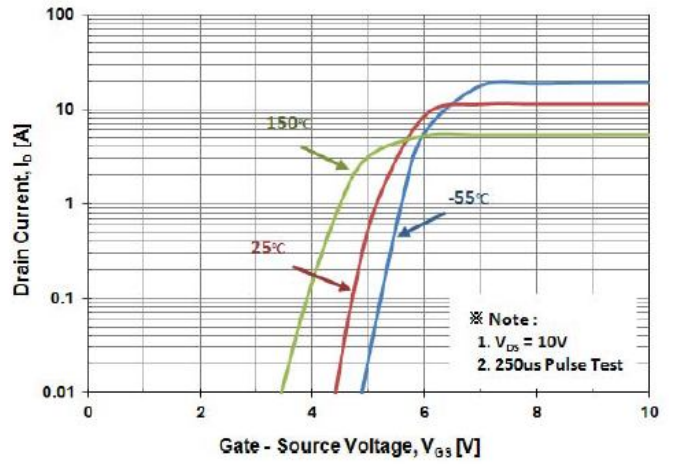


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

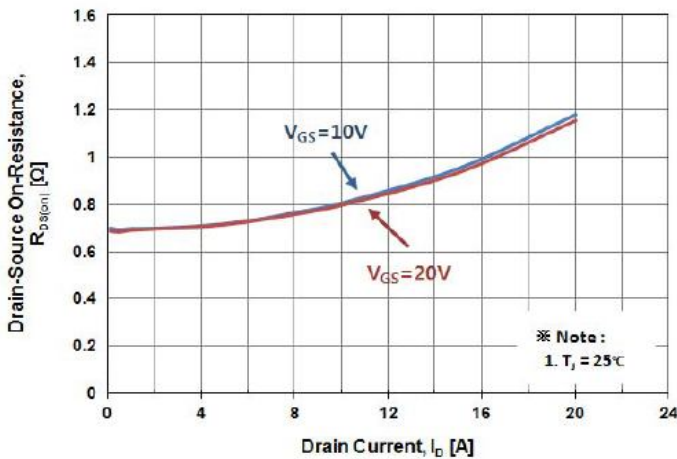


Fig. 4 Body Diode Forward Voltage Variation with Source Current

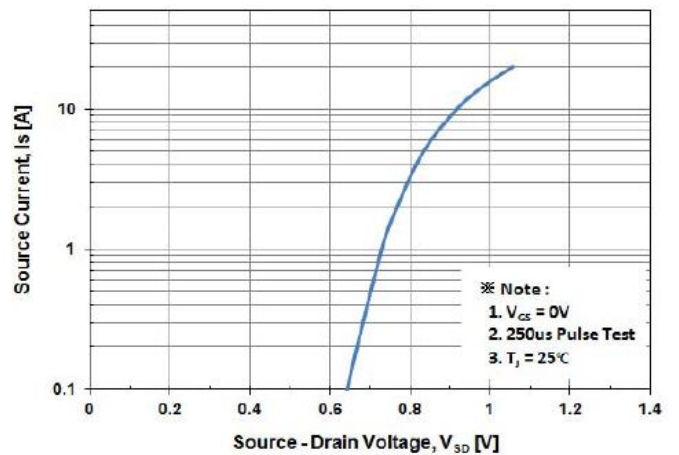


Fig. 5 Typical Capacitance Characteristics

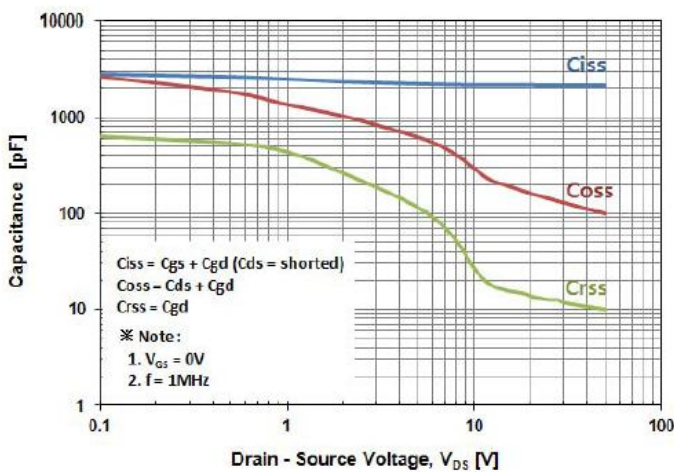
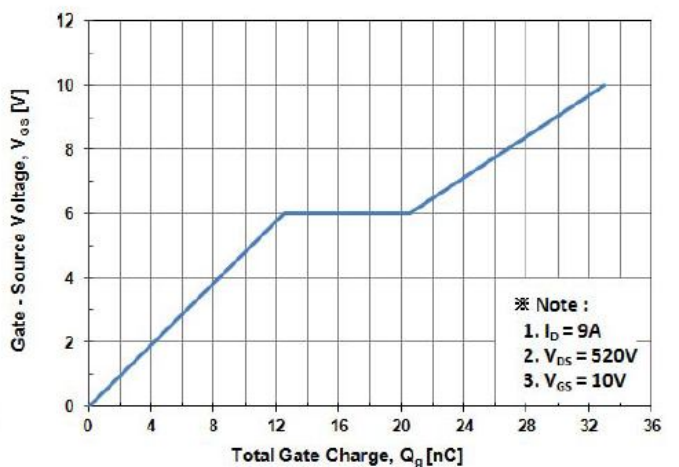


Fig. 6 Typical Total Gate Charge Characteristics



## Electrical Characteristic Curves

Fig. 7 Breakdown Voltage Variation vs. Temperature

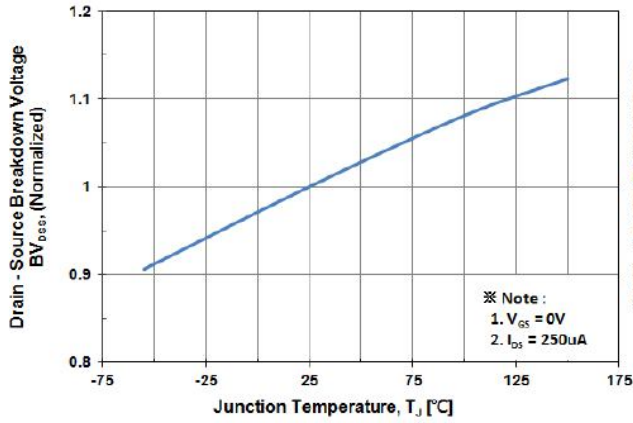


Fig. 8 On-Resistance Variation vs. Temperature

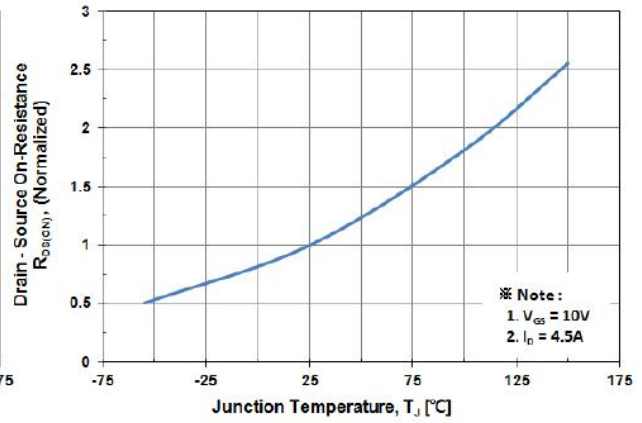


Fig. 9 Maximum Drain Current vs. Case Temperature

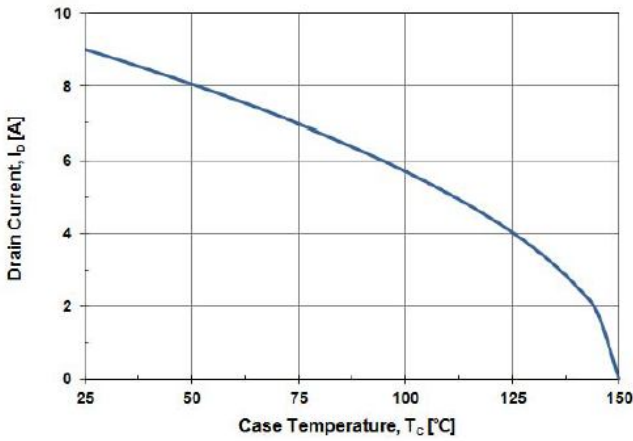


Fig. 10 Maximum Safe Operating Area

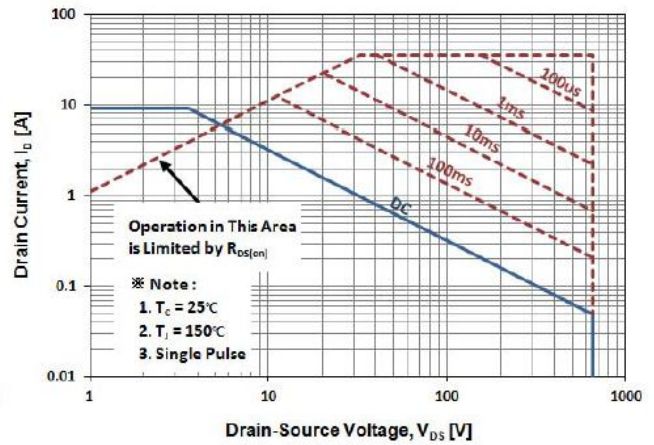


Fig. 11 Transient Thermal Impedance

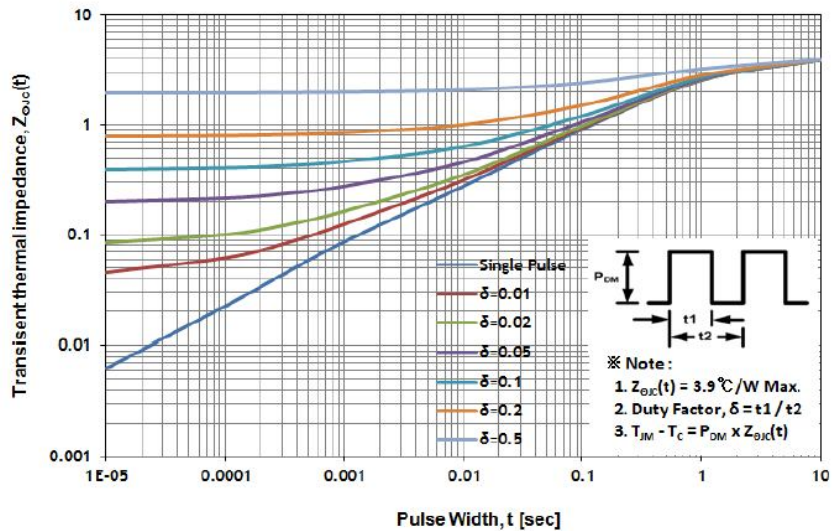


Fig. 11 Gate Charge Test Circuit & Waveform

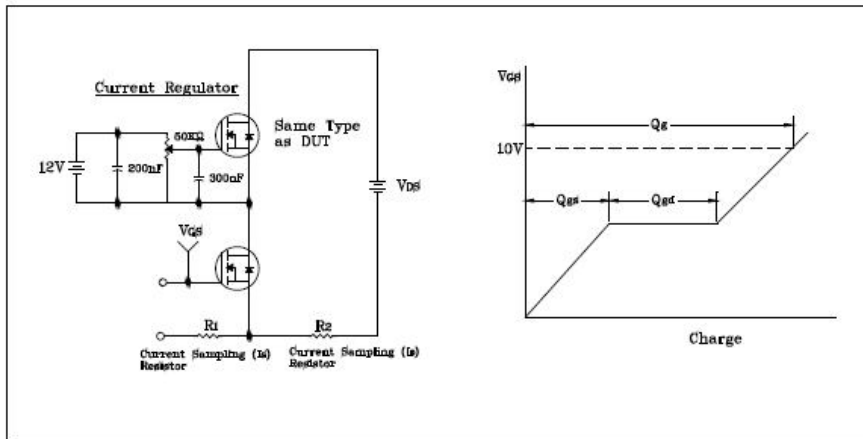


Fig. 12 Resistive Switching Test Circuit & Waveform

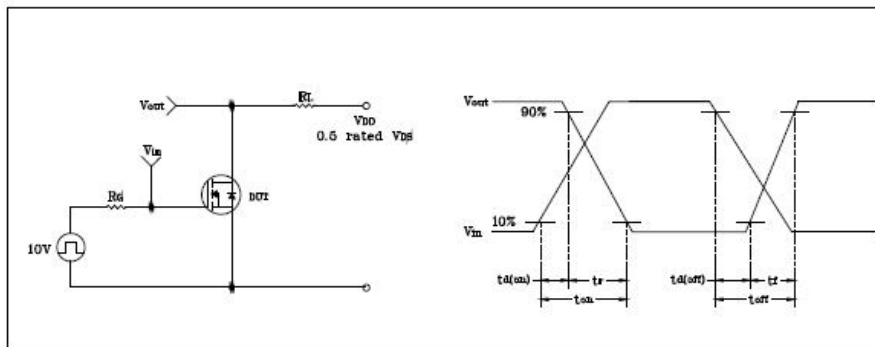


Fig. 13 E<sub>AS</sub> Test Circuit & Waveform

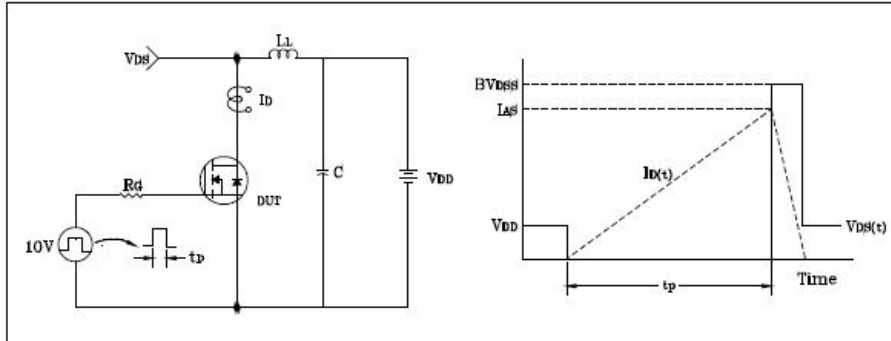
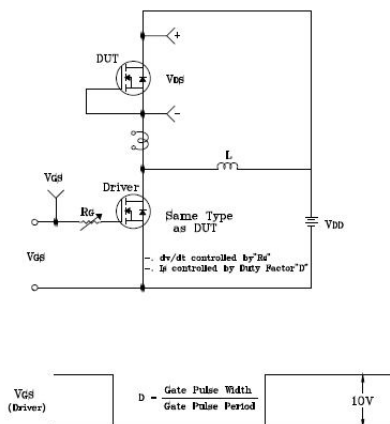


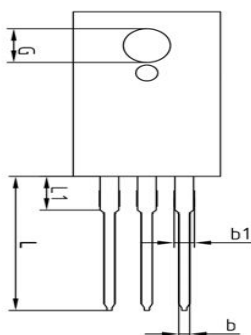
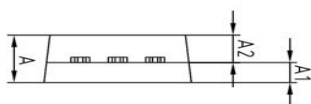
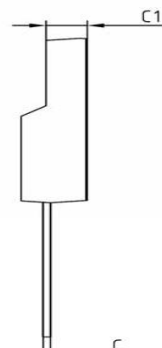
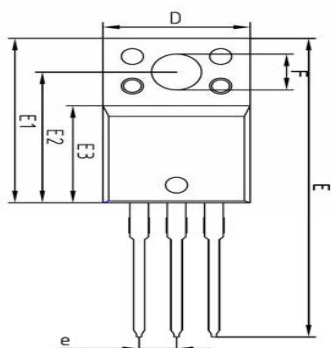
Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



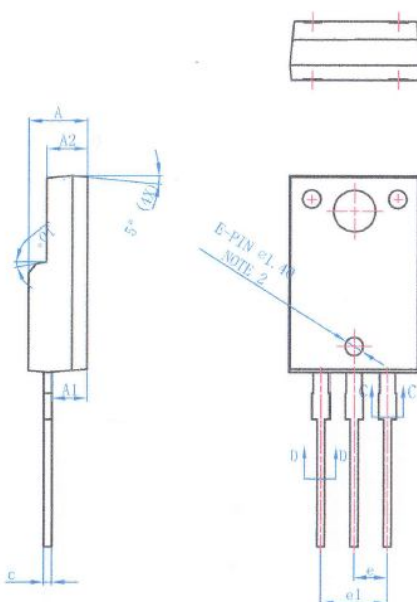
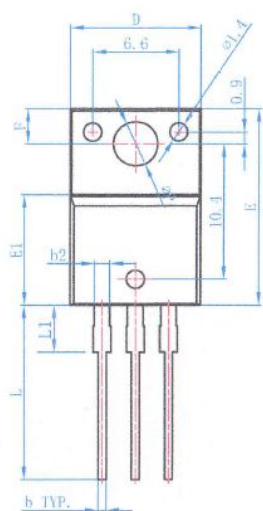
# KRK1065F/FA

## Outline Dimension

unit: mm

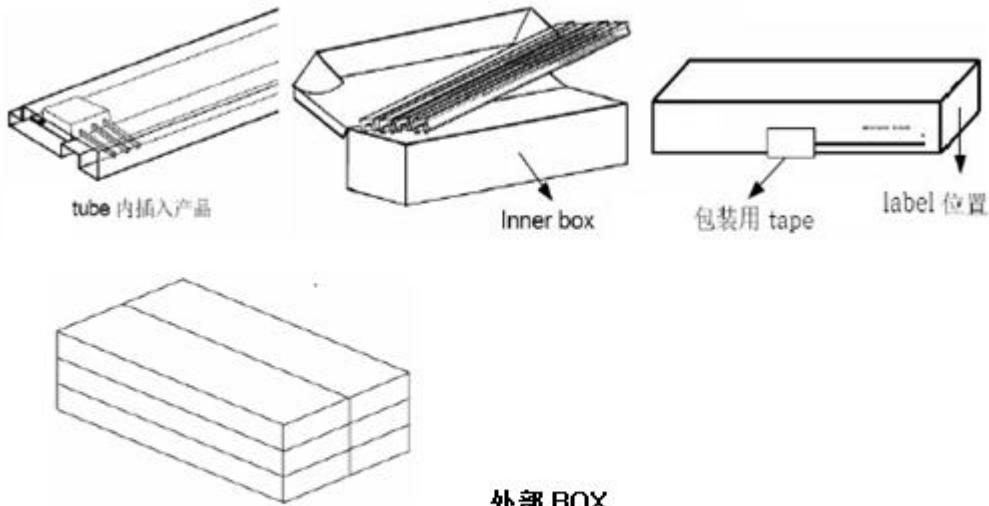


SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	—	—	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	—	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	—	13.00	
L1	3.46 BSC			



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.20	4.50	4.80	0.165	0.177	0.189
A1	2.50	—	2.90	0.098	—	0.114
A2	2.90	3.10	3.30	0.114	0.122	0.130
b	0.30	0.60	0.90	0.012	0.024	0.035
b1	0.30	—	0.90	0.012	—	0.035
b2	1.00	1.20	1.40	0.039	0.047	0.055
b3	1.00	—	1.40	0.039	—	0.055
c	—	0.60	—	—	0.024	—
D	9.90	10.00	10.10	0.390	0.394	0.398
E	14.80	15.10	15.40	0.583	0.594	0.606
E1	8.40	8.50	8.60	0.331	0.335	0.339
e	—	2.55BSC	—	—	0.100BSC	—
e1	—	5.10BSC	—	—	0.200BSC	—
F	2.55	2.70	2.85	—	0.106	0.112
L	13.00	13.40	13.80	0.512	0.528	0.543
L1	3.45	3.60	3.75	0.136	0.142	0.148
øP	2.90	3.20	3.50	0.114	0.126	0.138

## Packing Spec



外部 BOX

PKG	个/TUBE	TUBE/内部 BOX	个/内部 BOX	个/外部 BOX
TO220F	50	20	1,000	6,000

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